## Section 917. TURF AND LANDSCAPING MATERIALS

**917.01 General Requirements.** This section covers nursery stock, seed, sod, mulching material, and chemical fertilizer nutrients. The Contractor must provide documentation of inspection for plant diseases and insect infestation according to State and Federal laws.

**917.02 Testing.** Visual inspection or other basis of acceptance of landscaping material will be as specified in this section or in the *Materials Quality Assurance Manual.*

**917.03 Nursery Stock.** Nursery stock must come from nurseries located in Zones 4, 5, or 6 of the USDA Hardiness Zone Map (Zone 3 for landscaping in the Upper Peninsula only) and meet ANSI Specification Z 60.1, except that the size of the ball shall be as shown on the plans or proposal.

All nursery stock shall be true to type and name according to *Standardized Plant Names* published by the American Joint Committee on Horticultural Nomenclature. A sample of each plant species shall be clearly labeled with the age (if specified), species, and variety including the common and scientific names. All stock shall be of first-class quality, with well-developed branch systems and vigorous, healthy root systems. The trunks of trees shall be uniform and straight. All trees, ornamentals, and shrubs shall be balled and burlapped, unless otherwise specified.

The Contractor shall give the Engineer at least 24 hours notice before making any delivery of stock, and each shipment shall be accompanied by an invoice showing plant sizes, species and varieties. Acceptance for planting will not be made until the stock has been delivered and inspected at the project site. Plants may be examined at the nursery by removing soil from the root systems of balled or container grown plants, or digging in the nursery row. Sufficient plant root systems will be inspected for each species and plant source to determine the condition of plant root systems. Payment will not be made for plants rendered unsuitable for planting by this root system inspection.

A. **Deciduous Shade Trees.** These trees shall be straight and symmetrical with a persistent main leader. The crown shall be in good overall proportion to the total height of the tree.

   Where a clump is specified, it shall have a minimum of two stems originating from a common base at the groundline.

B. **Small Trees, Ornamentals, and Shrubs.** Plants shall be well formed and shall have a crown typical of the species or variety. Low-branched crown types shall be furnished. Heading-back plants to meet sizes called for on the plans will not be permitted.

C. **Evergreen Trees.** Trees shall be of a form typical to the species and not unnaturally sheared or color treated. Evergreen trees grown for Christmas trees are not acceptable. Anti-transpirent protection may be required for evergreen trees.

D. **Vines and Ground Cover Plants.** Plants shall be furnished in individual containers. The plants shall be at least one year old and shall have been grown in the pots long enough to ensure sufficient root growth to hold soil in place and retain the container shape when removed from the pot. Vines shall have at least 4 runners 1.5 feet long. Ground cover plants shall have tops which are proportional to their root systems and typical to species or variety.

**917.04 Tree Wrapping Materials.** Trees shall be wrapped with waterproof crepe tree wrapping paper secured with masking tape. Tree wrapping paper shall be at least 3 inches wide and shall consist of two layers of crepe kraft paper weighing at least 30 pounds per ream. The layers shall be cemented together with asphalt. Masking tape shall be at least 2 inches wide.

**917.05 Balling Material.** Balling material shall be untreated burlap. Synthetic balling materials such as nylon or plastic are not permitted.

**917.06 Bracing and Guying Materials.**

A. **Wire.** For trees less than 4 inches in diameter, the guy wire shall be No.11 galvanized steel. Trees over 4 inches in diameter shall be guyed using No. 9 galvanized steel wire. All wire shall be new and free from bends and kinks.

B. **Hose.** Hose used with wire to guy trees shall be ¾ inch reinforced rubber garden hose or steam hose.

C. **Stakes.** Stakes for bracing trees shall be green metal T-section posts with no anchor plates. For shade trees, the posts shall be at least 8 feet long. For evergreen trees, the posts shall be at least 6 feet long.

   Stakes for guying plants shall be sound wood of nominal 2 by 4 inch stock, approximately 24 inches in length. The stakes shall be pointed on one end by beveling on two or four sides.

**917.07 Topsoil.** Topsoil shall be visually inspected for organic contamination and cleanliness at the source by the Engineer prior to transport to the project site. Salvaged topsoil shall be inspected and approved by the Engineer. Topsoil shall not be contaminated and may not be a mixture of natural underlying soils, subbase materials, or other materials. It shall consist of natural loam, sandy loam, silty loam or clay loam humus-bearing soils adapted to the sustenance of plant life. Topsoil shall be neither excessively acidic nor excessively alkaline. It shall be of mineral origin, exclusive of any peat or muck.

**917.08 Compost.** Compost shall be a mature/stabilized, humus-like material derived from the aerobic decomposition of yard clippings or other compostable materials as designated in Part 115 of P.A. 451 of 1995 as amended and shall be in compliance with all federal and state laws. The compost shall have a dark brown or black color, be capable of supporting plant growth without ongoing addition of fertilizers or other soil amendments and shall not have an objectionable odor. The compost shall be free of plastic, glass, metal and other physical contaminants, as well as viable weed seeds and other plant parts capable of reproducing (except airborne weed species). The compost shall be visually inspected and approved at the composting site by the Engineer for physical contaminants. The compost moisture content shall be such that no visible free water or dust is produced when handling it. Compost must be supplied from a source listed on the Qualified Products List.

**917.09 Peat Moss.** Peat moss shall consist of finely shredded sphagnum or fibrous peat moss of an approved commercial grade, free from woody substance.

**917.10 Fertilizers.** Fertilizers intended for use in connection with landscape planting, landscape plant watering, seeding and sodding shall be standard, commercial, packaged or bulk products in granular or liquid form. Each container of packaged fertilizer shall be plainly marked by the manufacturer and shall include the analysis of the contents showing minimum percentages of total nitrogen, available phosphoric acid and soluble potash. When fertilizer is furnished in bulk, each shipment shall be accompanied by an invoice indicating the minimum percentages of total nitrogen, available phosphoric acid and soluble potash in the contents.

A. **Landscape Fertilizers.**

1. **Planting Fertilizers.** The fertilizer for mixing with peat moss and topsoil shall be a ready-mixed granular material containing equal amounts by weight of phosphorus and potassium. Each cubic yard of prepared soil shall contain sufficient chemical fertilizer to provide one pound each of available phosphorus and soluble potassium (i.e. 5 pounds of 0-20-20, 10 pounds of 0-10-10, etc.).

2. **Watering Fertilizers.** The fertilizer to be applied during the watering of landscape plants shall be a water soluble, nitrogen-enriched solution containing available nitrogen at the rate of 8.3 pounds per 1000 gallons of water (i.e. 42 pounds of 20-0-0, 18 pounds of 45-0-0, etc., fertilizer per 1000 gallons of water).

B. **Seeding and Sodding Fertilizers.** All fertilizers in each class shall contain a water insoluble and water soluble component.

1. **Class A.** Chemical nutrient for Class A fertilizer shall be in the following proportions:

   a. **Water Insoluble Fertilizer.** Thirty-three (33) pounds of actual water insoluble nitrogen will be applied per acre (i.e. 131 pounds of Ureaform or 118 of IBDU, etc.). The water insoluble nitrogen will be from ureaformaldehydes and/or coarse grade isobutylidene diurea.

   b. **Water Soluble Fertilizer.** Must contain a ratio of 1:1:1 between nitrogen, phosphorous and potassium. The rate of nitrogen, phosphorous and potassium shall be 65 pounds of actual nutrient per acre (i.e. 340 pounds of 19-19-19, 540 pounds of 12-12-12, etc.). Components of the fertilizer are to include urea, diammonium phosphate and potassium chloride.

2. **Class B.** Chemical nutrient for Class B fertilizer shall be in the following proportions:

   a. **Water Insoluble Fertilizer.** Thirty-two (32) pounds of actual water insoluble nitrogen will be applied per acre (i.e. 128 pounds of ureaform, 115 pounds of IBDU, etc.). The water insoluble nitrogen will be from ureaformaldehydes and/or coarse grade isobutylidene diurea.

   b. **Water Soluble Fertilizer.** The rate of nitrogen shall be 48 pounds of actual nutrient per acre and 40 pounds of actual potassium per acre (i.e. 104 pounds of 46-0-0 and 67 pounds of 0-0-60, etc.). Components of the fertilizer are to include urea and potassium chloride.

3. **Class C.** Chemical nutrient for Class C fertilizer shall be in the following proportions:

    a. **Water Insoluble Fertilizer.** Thirty-two (32) pounds of actual water insoluble nitrogen will be applied per acre (i.e.128 pounds Ureaform or 115 pounds IBDU, etc.). The water insoluble nitrogen will be from ureaformaldehydes and/or coarse grade isobutylidene diurea.

    b. **Water Soluble Fertilizer.** The rate of nitrogen shall be 48 pounds of actual nutrient per acre (i.e.104 pounds of 46-0-0, etc.). Components of the fertilizer are to include urea.

**917.11 Water.** Water shall meet the requirements of section 911 and be free from any impurities or substances which might injure the plant.

**917.12 Seed.** The specified seed and mixture shall be composed of certified seed of the purity, germination, and proportions, by weight, listed in Table 917-1. Seed for each species shall be selected from the Qualified Products List. Seeds shall be furnished in durable bags. On each bag of seed, the supplier of the blended mix shall attach a tag giving name, lot number, net weight of contents, purity and germination.

Seed testing shall be conducted according to the *Rules for Testing Seeds* specified in *The Proceedings of the Association of Official Seed Analysts.* Deficiencies below the percentage specified for purity and germination will be evaluated for acceptability by the Engineer.

**917.13 Sod.** Sod shall consist of a densely rooted blend of at least two bluegrass varieties with 15 percent to 30 percent creeping red fescue content, reasonably free from weeds and grown on soil that is the same as or similar to the topsoil at the project site. Sod shall be approved in the sod field by the Engineer before it is harvested. Efforts shall be made to select a sod which will adapt well to the salvaged or furnished topsoil at the construction site and with consideration of the future maintenance needs. Before cutting the sod, the grass shall be mowed to a maximum height of 3 to 4 inches above the surface of the ground.

The sod shall be cut at least ¾ inch thick to retain the dense root system of the grass and to allow handling without undue tearing or breaking. When sod is cut in strips it shall be cut in small uniform units approximately 1.5 by 6 feet, or in such width or length that the sod can be handled without undue tearing or breaking. Sod may be cut, transported and laid in large rolls with machinery designed for that purpose.

A. **Pegs for Sodding.** Pegs shall be made of sound wood, at least 10 inches long, and shall have a cross-sectional area of no less than 0.75 square inches. In sandy or other similar soils, longer pegs may be required.

**917.14 Mulching Materials for Nursery Stock.**

A. **Shredded Bark.** Shredded bark shall consist of tree bark which has been stripped and shredded from saw logs by means of a de-barking machine. The material shall readily pass through a conventional mulch blower. Wood chips will not be allowed.

**917.15 Mulch for Seed.**

A. **Loose Mulch.** Mulching material shall consist of any straw or marsh hay in an air-dry condition. Hay in an air-dried condition will be permitted only when straw mulch or marsh hay is unavailable. Mulch materials shall be clean, undamaged, and rot free. It shall be substantially free of weed seed and other objectionable foreign matter.

B. **Turf Mulch Blankets.** Mulch blankets shall be selected from the Qualified Products List.

1. **High Velocity Mulch Blankets.** The blankets shall have net covering on two sides. The net for the blanket shall meet subsection 917.15.D.1. The net shall provide the necessary reinforcement for protecting the blanket during shipping, handling, and installation.

a. **High Velocity Excelsior Mulch Blankets.** The high velocity excelsior mulch blankets shall be made from a uniform layer of interlocking excelsior fibers cut from sound, green timber.

Roll weight when manufactured shall average 12 ounces per square yard, ±10 percent. Weight of each roll at the time of manufacture and the name of manufacturer shall be written or stenciled on the roll wrapper, or on an attached tag. Average weight of an entire shipment shall be approximately 12 ounces per square yard. The blankets shall be shipped in the form of a tightly compressed roll.

b. **High Velocity Straw Mulch Blankets.** The high velocity straw mulch blankets shall be made of a uniform layer of straw. The straw shall be clean wheat straw free of weeds and weed seed. The straw and net covering shall be securely stitched together to create a uniform mat.

The blankets shall weigh (dry) 8 ounces per square yard, ±10 percent. Weight of each roll and name of manufacturer shall be written or stenciled on the roll wrapper or on an attached tag. Blankets shall be shipped in the form of a tightly compressed roll.

2. **Mulch Blankets.**

a. **Excelsior Mulch Blankets.** The excelsior mulch blankets shall meet subsection 917.15.B.1.a. except that the weight may be from 8 to 12 ounces per square yard and the netting shall be on one side.

b. **Straw Mulch Blankets.** The straw mulch blankets shall meet subsection 917.15.B.1.b except that the netting shall be on one side.

C. **Mulch Anchoring.** The material for anchoring mulch shall be selected from the Qualified Products List.

1. **Latex-Base.** The composition, by weight, of the latex emulsion polymer shall be 48 percent styrene, 50 percent butadiene, and 2 percent additive; 42.0 to 46.0 percent

solids; and a pH, as shipped, of 8.5 to 10.0. The emulsion shall not be allowed to freeze or to be exposed to sunlight for a prolonged period of time.

2. **Recycled Newsprint.** Recycled newsprint mulch shall consist of specifically prepared, biodegradable, shredded paper particles, consisting of recycled newsprint fibers. The recycled newsprint shall contain a wetting agent, defoaming agent, and nontoxic dyestuff that will impart a bright green or blue color. The dyestuff shall adhere tightly to the fiber minimizing leaching of the color after application. Recycled newsprint fiber shall meet the following minimum requirements.

| | |
|---|---|
| Moisture content (total weight) | 12% maximum |
| Shredded high-grade newsprint (oven dry) | 96% minimum |
| Tackifier, by weight | 1.5% to 3% |
| Water holding capacity (water per 3.5 ounces of fiber) | 32 ounces minimum |

3. **Wood Fiber.** Specially prepared, biodegradable, air-dried virgin wood fibers manufactured from 100 percent whole wood chips shall be used. The wood fiber shall be manufactured with a tackifier. Recycled materials will not be allowed. The fibers shall be dyed with a green or blue biodegradable dye to aid in visual metering during construction. The process and materials shall not contain growth or germination inhibiting materials. The wood fiber shall conform to the following specifications:

| | |
|---|---|
| Moisture content (total weight) | 12% maximum |
| Organic wood fiber (oven dry) | 95% minimum |
| Tackifier by weight | 3% to 5% |
| Water holding capacity (water per 3.5 ounces of fiber) | 35 ounces minimum |

4. **Guar Gum.** Guar gum tackifiers shall consist of a minimum of 95 percent guar gum by weight, the remaining shall be dispersing and crosslinking additives.

5. **Other Tackifiers.** Other tackifiers may include water soluble natural vegetable gums or guar gums blended with gelling and hardening agents or a water soluble blend of hydrophilic polymers, viscosifiers, sticking aids, and other gums.

D. **Mulch Netting.**

1. **Netting.** The net shall have a mesh size not larger than 1 ½ by 2 inches nor be smaller than ½ by ½ inch. The netting shall be fabricated from a plastic that has been formulated from or treated with a chemical which will promote the breakdown of the net within the first growing season after placement.

   The netting shall have sufficient strength to hold the mulch in place and still deteriorate rapidly upon exposure to sunlight. Products which have been found to be lacking in strength and deterioration requirements on other projects will not be permitted on subsequent projects.

2. **Net Anchors.** Devices used to hold the net in place shall be of the material and design specified in the contract documents, or as approved by the Engineer. Steel wire staples or pins may not be used to anchor mulch blankets or netting.

**917.16 Weed Control.** All herbicides selected for use by the Contractor must be registered for use on highway right-of-way by the Michigan Department of Agriculture and the United States Environmental Protection Agency. No restricted use herbicides shall be used.

**Table 917-1 Seed Mixtures**

| Species | Purity Min. % | Germination % | Seed Mixture | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Mixture Proportions (percent by weight) | | | | | | | | Rate [a] (lbs/acre) |
| | | | TDS | THV | TUF | TGM | THM | CR | TSM 6-24 | TSM 24 + | ES |
| Kentucky Blue Grass | 98 | 85 | 5 | 15 | 10 | 10 | 30 | | | | |
| Perennial Ryegrass | 96 | 85 | 25 | 30 | 20 | 20 | 20 | | 50 | 50 | 11 |
| Hard Fescue | 97 | 85 | 25 | | 20 | 30 | | | | | |
| Creeping Red Fescue | 97 | 85 | 45 | 45 | 40 | 40 | 50 | | | | |
| Fults Salt Grass | 98 | 85 | | 10 | 10 | | | | | | |
| Cereal Rye | 85 | 85 | | | | | | 100 | | | |
| Spring Oats | 85 | 85 | | | | | | | 50 | 50 | |
| Timothy | | | | | | | | | | | 24 |
| Little Blue Stem | | | | | | | | | | | 3 |
| Switchgrass | | | | | | | | | | | 4 |
| Indiangrass | | | | | | | | | | | 3 |
| Big Blue Stem | | | | | | | | | | | 9 |

a. ES seed mixture application rate is shown in pounds of pure live seed per acre.